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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Paper No. 0204

Application Number: 09/996,415
Filing Date: November 28, 2001
Appellant(s): VAN SLYKE ET AL.

MAILED

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GROUP 1700

Marc A. Rossi
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed December 8,2003.

(1) Real Party in Interest

A statement identifying the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

A statement identifying the related appeals and interferences which will directly affect or be directly affected by or have a bearing on the decision in the pending appeal is contained in the brief.

(3) Status of Claims

The statement of the status of the claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Invention

The summary of invention contained in the brief is correct.

(6) Issues

The appellant's statement of the issues in the brief is correct.

(7) Grouping of Claims

The rejection of claims 1-18 stand or fall together because appellant's brief does not include a statement that this grouping of claims does not stand or fall together and reasons in support thereof. See 37 CFR 1.192(c)(7).

(8) Claims Appealed

The copy of the appealed claims contained in the Appendix to the brief is correct.

(9) *Prior Art of Record*

4,197,814	Takagi	4-1980
4,233,937	Steube	11-1980
5,532,102	Soden	7-1996
6,237,529	Spahn	5-2001
US 2001/0006827	Yamazaki	7-2001
US 2001/0008121	Tanabe	7-2001

(10) *Grounds of Rejection*

The following ground(s) of rejection are applicable to the appealed claims:

Claims 1, 3-6, 15 and 17 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Spahn in view of Green, Yamazaki and Soden.

Spahn discloses a thermal physical vapor deposition source for organic materials. Spahn's apparatus includes a container for the material to be vaporized and a vaporization heater defining a vapor slit as presently claimed. Spahn teaches (col. 1, lines 42-47) that the container can be an electrically insluative material surrounded by a resistive heater. Spahn also teaches (col. 5, lines 33-40) that the container can be additionally heated to supplement the heat from the vaporization heater. Spahn does not specifically teach that the container can be additionally heated by a bias heater having sidewalls and a bottom wall, wherein the bias heater sidewalls are shorter than the container walls.

Green (see Fig. 1) teaches that a vaporization container can be successfully heated by placing the container in a bias heater having sidewalls and a bottom wall, wherein the bias heater sidewalls are shorter than the container walls. It would have been prima facie obvious to use a container heater of the type taught by Green to provide the additional heating suggested by Spahn, because Green teaches that a vaporization container can successfully be heated by his heater.

Spahn (col. 7, lines 2-5) discloses that his vaporizer is for use in a web coating process, and one skilled in the vacuum coating art would recognize a web coating process as a process of coating a moving web substrate, requiring relative motion between the vapor deposition source and the substrate. Green (col. 4, line 58 to col. 5, line 11) also makes clear that his evaporation source is for coating large moving sheets of glass. Furthermore, Yamazaki teaches that it is desirable to deposit OLED coatings on large substrates by using means for providing relative motion between an evaporation source and the substrate. It would have been obvious to one skilled in the art to utilize the vacuum evaporation source of Spahn to coat large substrates by using means for providing relative motion between Spahn's evaporation source and the large substrate to be coated as recited in part (f) of claim 1, because Yamazaki teaches that it is desirable to deposit OLED coatings on large substrates by using means for providing relative motion between an evaporation source and the substrate.

Soden (see Figs. 5 and 7, and col. 21, line 45 to col. 22, line 63) discloses a vacuum evaporation crucible source analogous to that of Spahn, Green and Yamazaki. Soden's evaporation source includes a crucible body and a lid defining a linear vapor

efflux aperture. Soden's evaporation source includes an electric resistance heater for heating the crucible and a separate electric resistance heater for heating the lid. Soden teaches that both heaters can be heated by the same power source (as in Spahn) _or_ a separate power source can be provided for each heater. Soden teaches that both alternatives provide acceptable results, but that the embodiment using two separate power sources is more desirable because it desirably provides independent control of the two heaters for more operating flexibility It would have been obvious to provide two separate power supplies for the bias heater and vaporization heater of Spahn, because Soden teaches that it is desirable to provide two separate power sources for two separate heaters to provide independent control and more operating flexibility. Soden specifically teaches that this independent control arrangement is more desirable than having the two heaters powered by a single power source as in Spahn.

Claims 2, 8-14, 16 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Spahn in view of Green, Yamazaki and Soden for the reasons stated above, taken in further view of Tanabe and Takagi. Tanabe and Takagi both teach that it is desirable to control a vacuum evaporation process by monitoring the temperature of a vacuum evaporation source and using feedback control to control the heater power supply. It would have been obvious to use a heater control means of the type taught by Tanabe and Takagi to control the heaters of Spahn because Tanabe and Takagi teach that such heater control provides a higher quality coating. Also, Takagi (col. 6, lines 54-56) teaches the general functional equivalence of a thermocouple and an optical pyrometer for measuring the temperature of a vacuum evaporator.

Claims 7 and 12-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Spahn in view of Green and Yamazaki, and in further view of Tanabe and Takagi for the reasons stated above and in further view of Steube, who discloses the use of a lead screw (see Figs. 8-10, for example) to provide relative motion between a vacuum evaporation source and a substrate to be coated. It would have been obvious to use a screw drive mechanism to cause the relative motion taught by Yamazaki, because Steube teaches that a screw drive can successfully be used to move a vacuum evaporation source. Steube (see abstract) also teaches the step of keeping his vaporizer in "park" until it is producing a steady vapor flux, and it would have been obvious to one skilled in the art to use a flux monitor and control means such as that taught by Tanabe and Takagi to monitor the flux from Yamazaki's vapor source prior to moving the vapor source.

(11) Response to Argument

Appellants have argued that Spahn does not disclose providing two discrete, independently controlled heaters. Spahn does suggest the use of two discrete heaters, however. "Discrete" is defined by the dictionary as " individually distinct". Spahn at col. 5, lines 30-40, and also in the paragraph bridging cols. 7 and 8, Spahn describes two individually distinct heaters, one heater being a radiant heater constituted by the top plate 20, and another heater being constituted by the housing 10.

Spahn describes them as having distinctly different functions. Spahn describes the function of the top plate radiant heater 20 as follows (see col. 5, lines 44-58):

> [it] heats the uppermost layer, for example the uppermost initial layer 42 of the solid organic electroluminescent material 40, by radiation only, thus providing a

> maximum chance for the uppermost layer going from the solid phase to the vapor phase and a minimum chance of heating solid organic electroluminescent material 40 below the uppermost level to a temperature at which adsorbed or absorbed gases evolving from the solid organic electroluminescent (usually powdery) material would cause the ejection of particulates or droplets upwards toward the vapor efflux aperture 22.

Spahn describes the function of the housing bias heater 10 as follows (see col. 8, lines 12-15):

> [to] provide a bias-level heating to enhance slow outgassing of gases entrapped in the solid organic electroluminescent material 40.

The question of whether they are two separate heaters or just one heater is not as important as the fact that Spahn teaches the desirability of providing two separate heating functions: (1) vaporization heating by the top plate 20, and (2) bias-level heating of the container to enhance slow outgassing. Spahn teaches that the top plate heater is for radiantly heating the evaporant, while the container housing heater is for providing bias-level heating.

It is important to note that Spahn at col. 8, lines 12-15 describes his vaporization container heater as a "bias-level heater" which is the same term used by appellants in their claim 1, part (a), wherein they specifically identify their vaporization container heater as "a bias heater".

Appellants have argued that Sodden's lid heater is for keeping the lid hot enough to prevent condensation of coating material on the lid. It is noted, however, that Spahn's heated lid will inherently perform this same desirable function.

Appellants have argued that Soden's crucible heater 65a is for vaporizing the coating material, while Spahn's crucible heater is for bias level heating instead of vaporizing. It is noted, however, that in both Spahn and Soden, the solid coating material recieves heat from two different heat sources, in the same basic manner. The heat contained in the heated solid material is the sum of the heat provided by the two sources, and it is the combined heat derived from both heat sources that brings the solid material to its vaporization point. It is noted also that the heated lid of Soden will also inherently emit radiant heat that will inherently be absorbed by the solid coating material contained in the vaporization crucible.

Regarding Soden, at page 7, lines 1-14 of the Brief, appellants have cited col. 22, lines 29-37 of Soden, as giving Soden's reason for providing two independent heaters. It is noted, however, that in this quoted portion of Soden, Soden is actually describing his first embodiment, in which only one heat source is used to heat both heaters. In this quoted passage, Soden explains that when both heaters are connected to the same heat source, the top heater reaches a much higher temperature than the lower crucible heater, because the crucible heater is in contact with the relatively cool bulk of the coating material, while the top heater is not in contact with the coating material. Thus, Soden is describing a problem associated with a lack of independent heater temperature control. When Soden subsequently describes his second embodiment and suggests independent heater control at col. 22, lines 42-46, one skilled in the art would recognize this second embodiment as a way of avoiding reaching an excessive temperature in surface 47. One skilled in the art would recognize from this the

desirability of providing independent temperature control for two different heaters that have two different assigned functions. One skilled in the art would also recognize that this teaching of soden is applicable to the directly analogous two-heater structure of Spahn.

It is noted also that Soden at col. 22, lines 55-57 lists further advantages of using independent heater temperature controls as follows:

> Advantages of this specific embodiment include reduced evaporation times and lowered temperature requirements for the heating of the selenium within the crucible.

Spahn discloses several embodiments of thermal physical vapor deposition sources for vaporizing solid organic materials, and as noted previously, he specifically suggests using a vaporization container made of an electrically insulative ceramic. His Fig. 9 embodiment (see also col. 8, lines 49-67) Illustrates the vaporization heater 20 of his invention disposed on upper side wall surfaces of an electrically insulative container for receiving the vaporizable solid organic material. Spahn does not discuss the use of an additional container heater in conjunction with the Fig. 9 embodiment to provide bias level heating for the electrically insulative container. It is noted, however, that in his discussion of his Fig. 6 embodiment, Spahn (col. 8, lines 1-15) also teaches that it is desirable to provide a vaporizer container with an additional heater to provide bias-level heating, in order to enhance slow outgassing of gases trapped in the solid organic source material. One skilled in the art would have recognized that Spahn's suggestion of providing an additional container bias heater to promote slow out-gassing was also applicable to the Fig. 9 embodiment, because eliminating trapped gases would be just

as desirable in the Fig. 9 embodiment as in the Fig. 6 embodiment. For that reason, it would have been obvious to one skilled in the art to apply Spahn's suggestion at col. 8, lines 12-15 of bias-level heating to enhance slow outgassing to the electrically insulative container embodiment of Fig. 9. The one remaining question is whether the particular means for heating a ceramic vaporization container as recited in the present claims is nonobvious. It is noted, however, that Spahn (col. 1, lines 42-47) teaches that it is well known to heat a ceramic vaporization container by surrounding it with a resistive heater. Furthermore, Green (Fig. 1) illustrates a specific example of a ceramic vaporization container defined by side and bottom walls as claimed, wherein the ceramic container is disposed in a heater that is also defined by side and bottom walls as claimed. Since this type of ceramic vaporziation container heater was well known in the prior art as a sucessful heating means, as evidenced by Spahn at col. 1, lines 42-47, and by Green, it would have been prima facie obvious to it as the heating means for applying bias-level heating, as suggested by Spahn, to Spahn's Fig. 9 vaporization container to desirably enhance slow outgassing. Soden provides further motivation for such a combination of prior art teachings, because Soden teaches that the use of separately controllable heaters provides more operating flexibility.

It is recognized that Spahn's Fig. 9 embodiment is optimized for use without an additional heater for the vaporization container, because Spahn provides it with a mirror coating 60 to retain heat. It still would have been obvious to one skilled in the prior art to modify spahn;s Fig. 9 embodiment to include a bias-level container heater as a substitute for the mirror coating 60, because Spahn discloses emboidments both with

and without the bisa-level heater, and he clearly explains the reason for including such a bias-level heater, which is to desirably enhance slow outgassing. As noted above, one skilled in the art would have recognized that enhancing slow outgassing would by just as desirable and just as applicable to the ceramic container of Spahn's Fig. 9 as it was to the metallic container of Spahn's Fig. 6.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,
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February 23, 2004

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